

Amendments to the Claims

Please cancel Claims 1-21, 44-49, 56-67 and 70-71. Please amend Claims 22, 26, 42, 43, 50-55, 68 and 69. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

Claims 1-21. (Canceled)

22. (Currently Amended) A method for preparing a macromolecule sample, comprising:
automatically acquiring a liquid mixture, the mixture comprising a macromolecule, one or more rough components that are larger than the macromolecule, and one or more fine components that are smaller than the macromolecule; and
automatically separating from the macromolecule at least a portion of the components by applying the mixture to each of a plurality of filters, with a pressure differential across each filter, the filters comprising a rough filter selected to separate at least a portion of the rough components and a fine filter selected to separate at least a portion of the fine components;
directing a liquid through the fine filter in a direction opposite to the direction of filtration, the macromolecule thus being directed further in the apparatus for analysis; and
directing a liquid through the rough filter in a direction opposite to the direction of filtration for cleaning the filter membrane surface to restore the filter membrane characteristics and capacity to its initial state prior to separating the macromolecule.
23. (Original) The method of Claim 22, wherein the macromolecule has a molecular weight between about 1,000 and about 200,000 AMU.
24. (Original) The method of Claim 23, wherein the fine components comprise salt components.

25. (Original) The method of Claim 24, further comprising automatically reducing the concentration of the salt components by at least 50%.
26. (Currently Amended) The method of Claim ~~[[24]]~~ 22, further comprising automatically increasing the macromolecule concentration by at least 100%.
27. (Original) The method of Claim 26, further comprising automatically reducing the concentration of the salt components by at least 50%.
28. (Original) The method of Claim 27, further comprising automatically reducing the concentration of the salt components by at least 75%.
29. (Original) The method of Claim 28, further comprising automatically increasing the macromolecule concentration by at least 200%.
30. (Original) The method of Claim 24, further comprising automatically controlling the concentration of ions in the mixture by sensing the ion concentration and adding an ion buffer.
31. (Original) The method of Claim 30, further comprising automatically directing a desalination buffer through the fine filter into the mixture.
32. (Original) The method of Claim 31, further comprising automatically controlling the concentration of hydrogen ion to be in a pH range from 6 to 8 by adding a pH buffer to the mixture.
33. (Original) The method of Claim 24, further comprising selecting the rough filter to separate rough components that have a molecular weight greater than about 110% of the molecular weight of the macromolecule.

34. (Original) The method of Claim 33, further comprising selecting the fine filter to separate fine components that have a molecular weight less than about 90% of the molecular weight of the macromolecule.
35. (Original) The method of Claim 24, further comprising automatically combining the macromolecule with a denaturation agent.
36. (Original) The method of Claim 35; wherein the denaturation agent is sodium dodecyl sulfate.
37. (Original) The method of Claim 34, further comprising automatically heating the macromolecule until at least partial denaturation occurs.
38. (Original) The method of Claim 35, further comprising automatically heating the macromolecule and the denaturation agent until at least partial denaturation of the macromolecule occurs.
39. (Original) The method of Claim 38, further comprising automatically heating the macromolecule and the denaturation agent to between from about 70 °C to about 100 °C for about 60 to about 600 seconds.
40. (Original) The method of Claim 39, further comprising automatically heating the macromolecule and the denaturation agent to about 90 °C for about 300 seconds.
41. (Original) The method of Claim 24, further comprising automatically lysing cells in the liquid mixture.
42. (Currently Amended) The method of Claim ~~[[42]]~~ 41, further comprising lysing cells in the liquid mixture by automatically adding a lysis buffer to the cells.

43. (Currently Amended) The method of Claim ~~[[43]]~~42, further comprising separating the macromolecule from at least a portion of insoluble lysed cell fragments by automatically applying the mixture to a lysis filter with a pressure differential across the filter.

Claims 44-49 (Canceled)

50. (Currently Amended) A method for preparing a macromolecule sample, comprising automatically:
- acquiring a liquid mixture, the mixture comprising a macromolecule and one or more salt components;
 - separating the macromolecule from at least a portion of the salt components by applying the mixture to a fine filter with a pressure differential across the filter; and
 - directing a liquid through the fine filter in a direction opposite to the direction of filtration, the macromolecule thus being directed further in the apparatus for analysis.
51. (Currently Amended) The method of Claim ~~[[51]]~~ 50, further comprising reducing the concentration of the salt components by at least 75%.
52. (Currently Amended) The method of Claim ~~[[52]]~~ 50, further comprising controlling the concentration of the salt components by directing a desalination buffer through the filter into the mixture.
53. (Currently Amended) The method of Claim ~~[[53]]~~ 50, further comprising increasing the macromolecule concentration by at least 200%.
54. (Currently Amended) The method of Claim ~~[[54]]~~ 50, further comprising selecting the filter to separate the macromolecule from at least a portion of components that have a molecular weight less than about 90% of the molecular weight of the macromolecule.
55. (Currently Amended) The method of Claim ~~[[55]]~~ 50, further comprising:
- combining the macromolecule with a denaturation agent; and

heating the combined macromolecule and denaturation agent until at least partial denaturation of the macromolecule occurs.

Claims 56-67 (Canceled)

68. (Currently Amended) An apparatus for preparing a macromolecule sample, comprising:

means for automatically acquiring a liquid mixture, the mixture comprising a macromolecule, one or more rough components that are larger than the macromolecule, and one or more fine components that are smaller than the macromolecule; and

means for automatically separating from the macromolecule at least a portion of the components by applying the mixture to each of a plurality of filters, with a pressure differential across each filter, the filters comprising a rough filter selected to separate at least a portion of the rough components and a fine filter selected to separate at least a portion of the fine components;

means for directing a liquid through the fine filter in a direction opposite to the direction of filtration, the macromolecule thus being directed further in the apparatus for analysis; and

means for directing a liquid through the rough filter in a direction opposite to the direction of filtration for cleaning the filter membrane surface to restore the filter membrane characteristics and capacity to its initial state prior to separating the macromolecule.

69. (Currently Amended) An apparatus for preparing a macromolecule sample, comprising:

means for automatically acquiring a liquid mixture, the mixture comprising a macromolecule and one or more salt components;

means for automatically separating the macromolecule from at least a portion of the salt components by applying the mixture to a fine filter with a pressure differential across the filter; and

means for directing a liquid through the fine filter in a direction opposite to the direction of filtration, the macromolecule thus being directed further in the apparatus for analysis.

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Claims 70-71 (Canceled)